BPI-4196
Issue Date
March 30, 2006

Boeing Chemical Process Management Implementation

Purpose/Summary

This business process instruction (BPI) defines the process for site implementation of Boeing Chemical Process Management (BCPM) for chemical solution tanklines, related wastewater treatment and recycling processes and related tank line chemical receiving, storage and distribution areas. Compliance with this process instruction satisfies the requirements of PRO-4174, "Boeing Chemical Process Management."

Supersedes

None

Applies To

All Boeing

Roles Affected

Site Executive Leader, Operations Manager, Site BCPM Focal, Tankline Process Owner, Tankline Management, Tankline Operation and Solution Maintenance, Material and Process Engineering, Maintenance Personnel, SHEA, Quality

Maintained By

Boeing Operations Council (BOC)

Authority Reference

Procedure PRO-4174, "Boeing Chemical Process Management"

Approved By

Alan Mulally
Operations & Quality Process Council Sponsor

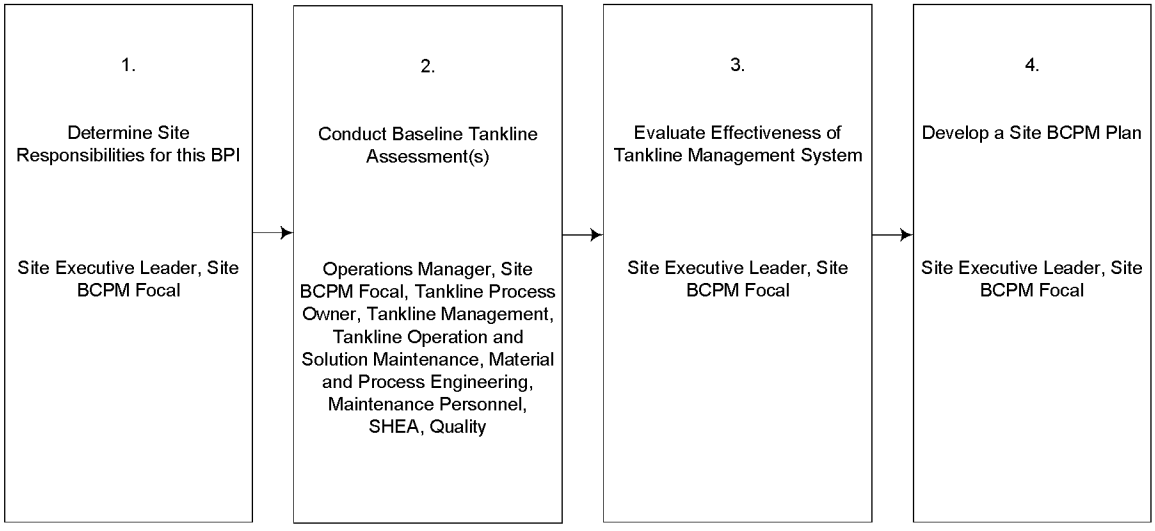
A. Scope

This process applies to all Boeing sites with chemical process tanklines as defined in this BPI. Sites that must comply with United States Occupational Safety and Health Administration (OSHA) Process Safety Management (PSM) and/or United States Environmental Protection Agency (EPA) Risk Management (RM) must follow the regulatory requirements in addition to requirements described in this process instruction. See Exhibit A for simplified requirements related to low hazard tanklines.

Input (Product/Service): Boeing requirements	Output (Product/Service): Documented Site BCPM Responsibility, risk assessment, management effectiveness evaluation and Site BCPM plan
From (Supplier): BCPM Council	To (Customer): Site Executive Leader, Operations Manager, Employee

B. Process Flow

BCPM Implementation Steps



C. Process Steps

These process steps describe actions that all affected Boeing sites must take to ensure compliance with Boeing Chemical Process Management.

1. Determine Site Responsibilities for this BPI

Role(s): Site Executive Leader, Site BCPM Focal

Input: Requirements of this BPI

Output: Completed Site BCPM Responsibility document

Site responsibility assignments are to be identified prior to starting risk assessments and must be recorded on the Site BCPM Responsibility document (Exhibit B). The document will be updated at least every 12 months. The current version of the document must be retained in site files.

1.1 Appoint Site BCPM Focal

Role: Site Executive Leader, Site BCPM Focal

The Site Executive Leader will appoint a Site BCPM Focal and will ensure the implementation of this BPI. In most cases the Site BCPM Focal should be a member of the management team operating affected chemical tanklines.

1.2 Identify Process Owner for Each Affected Tankline

Role: Site BCPM Focal

The Site BCPM Focal must identify a process owner for each affected tankline and record the process owner name on the Site BCPM Responsibility document (Exhibit B). In most cases, a process owner should be a manager overseeing tankline operation.

1.3 Screen Low Hazard Tanklines

Role: Site BCPM Focal

The Site BCPM Focal has the option to complete the BCPM Tankline Screening Tool (Exhibit A) to determine if a specific tankline may be exempted from other requirements of this process instruction. If utilized, the document must be completed annually and whenever a tankline process or equipment change occurs. The document must be approved by the manager with SHEA responsibility for the site.

2. Conduct Baseline Tankline Risk Assessment(s)

Role(s): Operations Manager, Site BCPM Focal, Tankline Process Owner, Tankline Management, Tankline Operation and Solution Maintenance, Material and Process Engineering, Maintenance Personnel, SHEA, Quality

Input: Requirements of this BPI

Output: Documented site tankline risk assessment(s)

The site baseline risk assessment(s) must be completed for each affected tankline within twelve months of the issue date of this BPI.

Prior risk assessments may be used as a baseline for this step provided that an on going management of change process has been in place following the risk assessment.

For new tank line installations, a tank line risk assessment must be completed prior to the installation and a baseline risk assessment must be completed within six months of installation.

Following the baseline risk assessment, any process changes must be subjected to review under a management of change process. (See Exhibit E, 5.B for management of change explanation.)

2.1 Form Tankline Risk Assessment Team

Role: Operations Manager, Site BCPM Focal, Tankline Process Owner, Tankline Management, Tankline Operation and Solution Maintenance, Material and Process Engineering, Maintenance Personnel, SHEA, Quality

The Tankline Process Owner is responsible to form a team of personnel involved with the affected tankline. This team will include personnel involved in the tankline design, operation and maintenance. As appropriate to the specific tankline, the team will have representatives from Operations Management, Maintenance Personnel (including management, engineering and maintenance specialists), Material and Process Engineering, SHEA, Quality, Tankline Management and Tankline Operation and Solution Maintenance.

The Site BCPM Focal is responsible to provide assistance as required to ensure this team is properly and fully staffed, and that the risk assessment is accomplished.

2.2 Perform Tankline Risk Assessment

Role(s): Tankline Process Owner

The Tankline Process Owner is responsible to ensure the risk assessment is accomplished by the tankline risk assessment team using information provided in Exhibit C and ranking potential risk using the tool provided in Exhibit D. Include tankline wastewater pre-treatment and/or recycling in association with site tankline(s) as well as tankline chemical storage and distribution.

The risk assessment must be documented and retained in site files until the plan required in Section 4 is completed and reviewed by a Shared Services Group SHEA audit of this activity.

3. Review Effectiveness of Tankline Management System

Role(s): Site BCPM Focal, Material and Process Engineering, Maintenance Personnel, SHEA, Quality

Input: Requirements of this BPI

Output: Documented Tankline Management System effectiveness evaluation.

Review(s) of tankline management system effectiveness must be completed for each affected tankline within twelve months of the issue date of this BPI and repeated every twelve months.

3.1 Form Team to Conduct Tankline Management Effectiveness Review(s)

Role(s): Site BCPM Focal, Material and Process Engineering, Maintenance Personnel, SHEA, Quality

The Site BCPM Focal is responsible for identifying knowledgeable personnel to perform the review(s). SHEA, Quality, Material and Process Engineering, Maintenance Personnel and other technical support may be asked to participate.

3.2 Perform Evaluation

Role(s): Site BCPM Focal

Using the Management Effectiveness Review provided in Exhibit E, the Site BCPM Focal provides assistance and ensures that the team performs and documents an evaluation of tankline management system effectiveness.

The initial tankline management effectiveness review(s) must be documented and retained in site files until all recommendations are completed and reviewed by a Shared Services Group SHEA audit of this activity.

4. Develop a Site BCPM Plan

Role(s): Site Executive Leader, Site BCPM Focal

Input: Requirements of this BPI

Output: Documented Site BCPM Plan

If significant risks per Exhibit D have been identified in site tankline risk assessment(s) or tankline management effectiveness review(s), a Site BCPM Plan is required to address the risk(s). These plans must be completed within twelve months of the issue date of this BPI and must be updated every twelve months.

If no significant risks are identified, a plan is not required. If moderate risks are identified, sites are encouraged to form action plans to address them.

As applicable, the site may use the elements of any existing RM or PSM plan to fulfill this requirement.

4.1 Form Site BCPM Plan Development Team

Role(s): Site BCPM Focal

The Site BCPM Focal is responsible to form a team of knowledgeable personnel involved with affected tankline(s) to develop and document a BCPM plan or plans.

4.2 Develop Site BCPM Plan

Role(s): Site BCPM Focal

Using the Template Site Plan provided in Exhibit F, the Site BCPM Focal provides assistance and ensures that the team prepares a written BCPM plan or plans to address significant risks identified in tankline risk assessment(s) or tankline management effectiveness review(s). The plan will include assigned responsibility, schedule and labor/non labor cost.

The BCPM plan must be retained in site files until all required corrective action is completed and reviewed by a Shared Services Group SHEA audit of this activity.

4.3 Obtain Approval for the Site BCPM Plan(s)

Role(s): Site BCPM Focal, Site Executive Leader

The Site BCPM Focal is responsible to meet with the Site Executive Leader to present the site BCPM Plan(s) for approval and signature.

The Site Executive Leader will review the BCPM Plan(s) and ensure necessary resources to implement and sustain the BCPM Plan(s) are included in the business plan.

4.4 Report Progress to Site Executive Leader

Role(s): Site BCPM Focal, Site Executive Leader

The Site BCPM Focal must track performance to the site plan(s) and report progress to the Site Executive Leader.

All Site BCPM Plan action items must be tracked to closure.

D. Acronyms

ANSI	American National Standards Institute
API	American Petroleum Institute
BCPM	Boeing Chemical Process Management

BOC	Boeing Operations Council
EPA	Environmental Protection Agency
FMEA	Failure Mode and Effects Analysis
HAZOP	Hazard and Operability Review
MSDS	Material Safety Data Sheet
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Administration
PHA	Process Hazard Analysis
PSM	Process Safety Management (OSHA)
RMP	Risk Management Plan (EPA)
SHEA	Safety, Health and Environmental Affairs

E. Definitions

Management of Change

Changes to process chemicals, technology, equipment, facilities or personnel need to be properly managed by systematically identifying and reviewing them prior to implementation of the change. Management of change includes all modifications to equipment, procedures, raw materials and processing conditions other than "replacement in kind".

Moderate Risk

"Moderate Risks" are those identified by the severity and probability criteria included in the Risk Assessment Management Tool provided as Exhibit D. Upon written approval of Boeing's Group SHEA Director, sites may identify moderate risks by use of an alternative risk management tool to Exhibit D.

Significant Risk

"Significant Risks" are those identified by the severity and probability criteria included in the Risk Assessment Management Tool provided as Exhibit D. Upon written approval of Boeing's Group SHEA Director, sites may identify significant risks by use of an alternative risk management tool to Exhibit D.

Site

The Boeing-owned, operated, or leased facility at a geographical location that maintains and operates an affected tankline. The site may be a Manufacturing Business Unit (MBU) located with other MBUs at a common geographical facility.

Tankline

A tankline is a series of tanks with chemical solutions involved in one of the following processes: plating, chemical milling, etching, deoxidizing, desmutting, immersion surface coating, immersion organic surface treatment, descaling, molten salt heat treat, or immersion paint stripping.

For the purposes of this BPI, tanklines are defined to include wastewater pre-treatment of tankline contents, recycling in association with tankline(s) and chemical storage/distribution for tanklines.

Unless they are associated with a tankline as defined above, this BPI excludes tanks involved with the following processes: solvent cleaning, detergent or aqueous degreasing baths or vapor degreasing. Sites must ensure that applicable regulation and permit requirements are followed for these tanks.

Sites may exclude specific low hazard tanklines by annual completion of the BCPM Tankline Screening Tool (Exhibit A) if all questions have "yes" answers.

F. References

U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) standard 1910.119, "Process Safety Management of Highly Hazardous Chemicals"

U.S. Environmental Protection Agency (EPA), 40 CFR Part 68 (1990 Clean Air Act Amendments), Section 112(r)(7), "Accidental Prevention: Risk Management"

PRO-1872, "Internal Control Definition and Responsibilities"

G. Related Writings

PRO-910, "Safety, Health, and Environmental Protection"

PRO-2616, "Hazardous Materials Emergency Preparedness, Response, and Reporting"

PRO-2924, "Hot Work Operations"

Exhibit A
BCPM Tankline Screening Tool

If your site's answer is YES to all of the questions listed below, the listed tankline is exempt from other requirements of this BPI and PRO-4174. This document must be completed annually and approved by the manager with SHEA responsibility for the site.

Site Name: _____

Tankline Location: _____

Tankline Identification: _____

1. [Y] [N] Quantity of process (non-rinse) tank contents are less than 250 gallons per tank or the tank contents do not meet any of the characteristics of a hazardous waste as defined by federal regulations.
2. [Y] [N] Tanks Do Not Contain "Extremely Hazardous Substances" > 5% as defined by EPCRA (Emergency Planning and Community Right-To-Know Act).
3. [Y] [N] Incompatible chemicals have been identified, separate containment has been provided and measures to prevent inadvertent mixing are in place for the tankline and associated storage areas.
4. [Y] [N] Secondary Containment will prevent a release of liquids to the environment.
5. [Y] [N] Chemical additions/make-ups are made from portable (≤ 55 gallon) containers only.
6. [Y] [N] Routine (periodic) inspections are conducted and include identification of deficiencies such as leaks, spills and signs of deterioration.
7. [Y] [N] Routine preventive maintenance (PM) is conducted for all tanks and related equipment.
8. [Y] [N] Required hazard labels, signs, and placards are posted on all tanks.
9. [Y] [N] Employees have completed Hazard Communication training and have access to MSDSs (Material Safety Data Sheets) for all chemicals used in the tank line.
10. [Y] [N] Employees have all personal protective equipment required by 29 CFR 1910.
11. [Y] [N] The Site has a current Emergency Response Plan.
12. [Y] [N] There is a process in place for site SHEA to review all significant changes to chemicals, tanks and related equipment.
13. [Y] [N] Contractors who work in tankline areas are provided with information on chemical hazards and safety precautions prior to beginning work.
14. [Y] [N] Written instructions or procedures are in place for filling and draining tanks and affected personnel have been trained in these requirements.

Completed by: _____ Date: _____
(Signature) (Printed Name)

Approved by: _____ Date: _____
(Signature) (Printed Name)

Exhibit B

Site BCPM Responsibility

Date: _____

Site Name: _____

Site BCPM Focal: _____

Tankline Location Building and Column	Tankline Identification (name/number)	Chemical Tankline Process Owner (Name and BEMS ID))

Note: The current record is retained in site files

Exhibit C
Supplementary Information on Risk Assessments

Conduct tankline risk assessments (Reference PRO-4174, Section 2.A.1.a) to identify potential risks. Use the tool in Exhibit D to categorize the risk according to severity and probability.

In preparation for the risk assessment, consider applicable codes, permits, regulations and standards which may include ANSI, API, NFPA, Building Codes etc. Also review applicable MSDS, engineering drawings, hazardous communication, training materials, process flows/descriptions, chemical compatibility matrix, history of spills/incidents/near misses, preventive maintenance records, etc.

The risk assessment will:

- Help identify potential causes of deviations to existing processes, identify existing safeguards, rank the relative significance of the deviations and make recommendations to mitigate the risks identified, and
- Identify deficiencies with the procedures and systems used to manage site chemical processes.

The results of the analysis are reported to management. The recommendations to reduce or eliminate the significant risks (See Exhibit D) are tracked to completion and periodic progress reports are provided to Site Executive Management.

Various methods of risk assessment are available including:

1) Process Hazard Analysis (PHA) – including What If? – Checklist, Hazard and Operability Study (HAZOP)
2) Failure Mode and Effects Analysis (FMEA)
3) Fault Tree Analysis.

For more information, see CFR 1910.119 Process safety management of highly hazardous chemicals; Section (e) Process Hazard Analysis and CFR 1910.119 Appendix C, Compliance Guidelines and Recommendations for Process Safety Management (Non-mandatory); Section 4 Process Hazard Analysis.

- These references provide information about available methods.
- An appropriate equivalent methodology is allowed if rationale for equivalence is provided in the risk assessment report.
- Note that these references are for the purposes of identifying available risk assessment tools and do not require all sites to achieve regulatory compliance to CFR 1910.119.

Exhibit D

Risk Assessment Management Tool

Severity of Consequences					
Category	**Personnel**	**Equipment Loss ($)**	**Down Time**	**Product Loss ($)**	**Environmental Effect**
I Catastrophic	Death	> 10M	>4 months	>10M	Long term damage &/or legal requirement
II Critical	Severe injury or illness or legal requirement	10M to 2.5 M	4 months to 2 weeks	10M to 2.5M	Medium term damage &/or legal requirement
III Marginal	Minor injury or illness	2.5M to 100K	2 weeks to 1 day	2.5M to 100K	Short term damage & no legal requirement
IV Negligible	No injury or illness	<100K	< 1 day	<100K	Minor damage & no legal requirement

Probability of Mishap		
Level	**Descriptive**	**Definition**
A	Frequent	Likely to occur repeatedly in system life cycle
B	Probable	Likely to occur several times in system life cycle
C	Occasional	Likely to occur sometime in system life cycle
D	Remote	Not likely to occur in system life cycle, but possible
E	Improbable	So unlikely it can be assumed not to occur

Risk Matrix

		Probability				
		E	**D**	**C**	**B**	**A**
Severity	**I**					
	II					
	III					
	IV					

Key

	Low Risk
	Moderate Risk
	Significant Risk

Exhibit E

Management Effectiveness Review

(Sheet 1 of 3)

The following control components shall be included in the site tankline management system effectiveness review. Each control component must be reviewed and the extent of the review must be consistent with the site presented risks. Refer to PRO-1872.

1. Leadership / Resources / Procedures

A. Executive management understands BCPM risks and provides budget to mitigate risks.

B. Sufficient professional staff with expertise to manage site BCPM risk is utilized.

C. Tankline operators are involved in BCPM related risk identification/control activities.

D. Appropriate process documentation is developed to manage BCPM tankline risks.

2. Risk Assessment and Prioritization (See Exhibits C and D)

The site is engaged in a structured effort to identify, assess, prioritize, and mitigate BCPM risk including a review of information concerning process chemicals, process technology, process equipment and start-up / shutdown procedures.

3. Risk Mitigation / Control

A. A review process for contractors / employees that perform tankline work activities is utilized to verify that contractors employ workers with appropriate job skills, knowledge and certifications required to perform the work in a safe manner.

B. BCPM related documentation of processes have an update and review process established.

C. Emergency plans are in place so that the site can respond effectively with the community to mitigate the impact on people and the environment in the event of an unintended release from a chemical process.

D. A process is in place to investigate the underlying causes of incidents and implement steps to prevent similar events from occurring.

Exhibit E

Management System Audit Checklist

(Sheet 2 of 3)

3. Risk Mitigation / Control (continued)

E. A process is in place to ensure that that heat or spark-generating work conducted in or near operating or charged chemical processes poses no risk to employees, assets, operations or the environment.

F. A mechanical integrity program is in place to assure the continued integrity of tankline process and control equipment.

- Elements of a mechanical integrity program include:
  - The identification and categorization of equipment and instrumentation;
  - Testing and inspection frequencies;
  - Development of maintenance procedures;
  - The establishment of criteria for acceptable test results;
  - Documentation of test and inspection results; and
  - Documentation of manufacturer recommendations as to meantime to failure for equipment and instrumentation.

4. Records / Communication / Training

A. Accurate and understandable operating procedures are in place.

- Operating procedures should describe the following:
  - Tasks to be performed;
  - Data to be recorded;
  - Operating conditions to be maintained;
  - Samples to be collected;
  - Safety and health precautions to be taken.

Exhibit E

Management System Audit Checklist

(Sheet 3 of 3)

4. Records / Communication / Training (continued)

B. Required records for tankline operations are established and maintained.

C. Employees, including maintenance and contractor employees, are being trained per established requirements and associated BCPM risks.

D. Vendors, suppliers, contractors, and employees are kept informed on relevant site BCPM issues.

5. Inspection / Review

A. Process is in place to validate internal controls are effective to manage BCPM related risk.

B. A management of change process is in place to manage and review (in advance) changes to equipment, procedures, raw materials and processing conditions other than “replacement in kind”.

Exhibit F

Recommended Chemical Process Management Plan Template

(Sheet 1 of 2)

I. Subject: Boeing Chemical Process Management (BCPM) Plan

II. Plan Purpose

1) Defines the responsibilities and activities required to implement the site Chemical Process Management Company Procedure in accordance with this BPI.
2) Boeing Chemical Process Management (BCPM) is the Company best practice for managing affected chemical processes in an efficient, safe and reliable manner.
3) The intent of BCPM is to create procedures, standards, and controls that will ensure the efficient, safe and reliable operation and maintenance of affected chemical tank line processes.

III. List and Define Applicable Roles and Responsibilities

1) Identify the team members filling the roles.
2) Identify persons responsible for obtaining resources and budget.
3) Identify persons responsible for scheduling and tracking action items.

IV. List and Define the BCPM Tasks

1) Development of schedules, deliverables, and the allocation of personnel, financial and other resources to accomplish the plan.
2) Track and report status of BCPM implementation.
3) Make recommendations for modification and enhancement of chemical process facilities based on process hazards.
4) Review process hazard analyses recommendations and audit results for necessary improvements to site infrastructure, procedures and employee training.
5) Share with all affected organizations the procedures, processes and standards of BCPM implementation efforts. Identify the Team/Board that will help ensure that Site organizations work together to implement BCPM.
6) Reference chemical equipment design standards as appropriate.

Exhibit F

Recommended Chemical Process Management Plan Template

(Sheet 2 of 2)

V. Describe the Areas/Tanklines Covered by the Plan

VI. Risk Analysis Recommendations

VII. Training Curricula

VIII. Schedule

1) Implementation
2) Retention
3) Review and update plan schedule
4) Track to closure

IX. Resources

X. References